Pushing the Envelope			
2007 Mathematics			
Academic Standards			
Minnesota Mathematics			
Grade 5			
Activity/Lesson	**State**	**Standards**	
Physics and Math (pgs. 43-63)	MN	MA.5.5.2.3.1	Understand and interpret equations and inequalities involving variables and whole numbers, and use them to represent and solve real-world and mathematical problems. Determine whether an equation or inequality involving a variable is true or false for a given value of the variable.
Physics and Math (pgs. 43-63)	MN	MA.5.5.2.3.2	Understand and interpret equations and inequalities involving variables and whole numbers, and use them to represent and solve real-world and mathematical problems. Represent real-world situations using equations and inequalities involving variables. Create real-world situations corresponding to equations and inequalities.
Physics and Math (pgs. 43-63)	MN	MA.5.5.2.3.3	Understand and interpret equations and inequalities involving variables and whole numbers, and use them to represent and solve real-world and mathematical problems. Evaluate expressions and solve equations involving variables when values for the variables are given.
Pushing the Envelope			
2007 Mathematics			
Academic Standards			
Minnesota Mathematics			
Grade 6			
Activity/Lesson	**State**	**Standards**	
Physics and Math (pgs. 43-63)	MN	MA.6.6.1.1.3	Read, write, represent and compare positive rational numbers expressed as fractions, decimals, percents and ratios; write positive integers as products of factors; use these representations in real-world and mathematical situations. Understand that percent represents parts out of 100 and ratios to 100.
Physics and Math (pgs. 43-63)	MN	MA.6.6.1.2.1	Understand the concept of ratio and its relationship to fractions and to the multiplication and division of whole numbers. Use ratios to solve real-world and mathematical problems. Identify and use ratios to compare quantities; understand that comparing quantities using ratios is not the same as comparing quantities using subtraction.

Physics and Math (pgs. 43-63)	MN	MA.6.6.1.2.2	Understand the concept of ratio and its relationship to fractions and to the multiplication and division of whole numbers. Use ratios to solve real-world and mathematical problems. Apply the relationship between ratios, equivalent fractions and percents to solve problems in various contexts, including those involving mixtures and concentrations.
Physics and Math (pgs. 43-63)	MN	MA.6.6.1.2.3	Understand the concept of ratio and its relationship to fractions and to the multiplication and division of whole numbers. Use ratios to solve real-world and mathematical problems. Determine the rate for ratios of quantities with different units.
Physics and Math (pgs. 43-63)	MN	MA.6.6.1.2.4	Understand the concept of ratio and its relationship to fractions and to the multiplication and division of whole numbers. Use ratios to solve real-world and mathematical problems. Use reasoning about multiplication and division to solve ratio and rate problems.
Physics and Math (pgs. 43-63)	MN	MA.6.6.2.1.1	Recognize and represent relationships between varying quantities; translate from one representation to another; use patterns, tables, graphs and rules to solve real-world and mathematical problems. Understand that a variable can be used to represent a quantity that can change, often in relationship to another changing quantity. Use variables in various contexts.
Physics and Math (pgs. 43-63)	MN	MA.6.6.2.1.2	Recognize and represent relationships between varying quantities; translate from one representation to another; use patterns, tables, graphs and rules to solve real-world and mathematical problems. Represent the relationship between two varying quantities with function rules, graphs and tables; translate between any two of these representations.
Physics and Math (pgs. 43-63)	MN	MA.6.6.2.3.1	Understand and interpret equations and inequalities involving variables and positive rational numbers. Use equations and inequalities to represent real-world and mathematical problems; use the idea of maintaining equality to solve equations. Interpret solutions in the original context. Represent real-world or mathematical situations using equations and inequalities involving variables and positive rational numbers.
Pushing the Envelope			
2007 Mathematics			
Academic Standards			
Minnesota Mathematics			

Grade 7			
Activity/Lesson	**State**	**Standards**	
Physics and Math (pgs. 43-63)	MN	MA.7.7.1.1.1	Read, write, represent and compare positive and negative rational numbers, expressed as integers, fractions and decimals. Know that every rational number can be written as the ratio of two integers or as a terminating or repeating decimal. Recognize that pi is not rational, but that it can be approximated by rational numbers such as 22/7 and 3.14.
Physics and Math (pgs. 43-63)	MN	MA.7.7.1.2.5	Calculate with positive and negative rational numbers, and rational numbers with whole number exponents, to solve real-world and mathematical problems. Use proportional reasoning to solve problems involving ratios in various contexts.
Physics and Math (pgs. 43-63)	MN	MA.7.7.2.1.1	Understand the concept of proportionality in real-world and mathematical situations, and distinguish between proportional and other relationships. Understand that a relationship between two variables, x and y, is proportional if it can be expressed in the form y/x = k or y = kx. Distinguish proportional relationships from other relationships, including inversely proportional relationships (xy=k or y= k/x).
Physics and Math (pgs. 43-63)	MN	MA.7.7.2.2.1	Recognize proportional relationships in real-world and mathematical situations; represent these and other relationships with tables, verbal descriptions, symbols and graphs; solve problems involving proportional relationships and explain results in the original context. Represent proportional relationships with tables, verbal descriptions, symbols, equations and graphs; translate from one representation to another. Determine the unit rate (constant of proportionality or slope) given any of these representations.
Physics and Math (pgs. 43-63)	MN	MA.7.7.2.2.4	Recognize proportional relationships in real-world and mathematical situations; represent these and other relationships with tables, verbal descriptions, symbols and graphs; solve problems involving proportional relationships and explain results in the original context. Represent real-world or mathematical situations using equations and inequalities involving variables and positive and negative rational numbers.

Physics and Math (pgs. 43-63)	MN	MA.7.7.2.4.1	Represent real-world and mathematical situations using equations with variables. Solve equations symbolically, using the properties of equality. Also solve equations graphically and numerically. Interpret solutions in the original context. Represent relationships in various contexts with equations involving variables and positive and negative rational numbers. Use the properties of equality to solve for the value of a variable. Interpret the solution in the original context.

Pushing the Envelope			
2007 Mathematics			
Academic Standards			
Minnesota Mathematics			
Grade 8			
Activity/Lesson	**State**	**Standards**	
Physics and Math (pgs. 43-63)	MN	MA.8.8.2.1.2	Understand the concept of function in real-world and mathematical situations, and distinguish between linear and nonlinear functions. Use linear functions to represent relationships in which changing the input variable by some amount leads to a change in the output variable that is a constant times that amount.
Physics and Math (pgs. 43-63)	MN	MA.8.8.2.2.1	Recognize linear functions in real-world and mathematical situations; represent linear functions and other functions with tables, verbal descriptions, symbols and graphs; solve problems involving these functions and explain results in the original. Represent linear functions with tables, verbal descriptions, symbols, equations and graphs; translate from one representation to another.
Physics and Math (pgs. 43-63)	MN	MA.8.8.2.2.2	Recognize linear functions in real-world and mathematical situations; represent linear functions and other functions with tables, verbal descriptions, symbols and graphs; solve problems involving these functions and explain results in the original. Identify graphical properties of linear functions including slopes and intercepts. Know that the slope equals the rate of change, and that the y-intercept is zero when the function represents a proportional relationship.

Physics and Math (pgs. 43-63)	MN	MA.8.8.2.4.1	Represent real-world and mathematical situations using equations and inequalities involving linear expressions. Solve equations and inequalities symbolically and graphically. Interpret solutions in the original context. Use linear equations to represent situations involving a constant rate of change, including proportional and non-proportional relationships.
		Pushing the Envelope	
		2007 Mathematics	
		Academic Standards	
Minnesota Mathematics			
Grades 9-11			
Activity/Lesson	**State**	**Standards**	
Chemistry (pgs. 25-41)	MN	MA.9-11.9.2.3.5	Generate equivalent algebraic expressions involving polynomials and radicals; use algebraic properties to evaluate expressions. Check whether a given complex number is a solution of a quadratic equation by substituting it for the variable and evaluating the expression, using arithmetic with complex numbers.
Chemistry (pgs. 25-41)	MN	MA.9-11.9.2.3.7	Generate equivalent algebraic expressions involving polynomials and radicals; use algebraic properties to evaluate expressions. Justify steps in generating equivalent expressions by identifying the properties used. Use substitution to check the equality of expressions for some particular values of the variables; recognize that checking with substitution does not guarantee equality of expressions for all values of the variables.
Chemistry (pgs. 25-41)	MN	MA.9-11.9.3.1.2	Calculate measurements of plane and solid geometric figures; know that physical measurements depend on the choice of a unit and that they are approximations. Compose and decompose two- and three-dimensional figures; use decomposition to determine the perimeter, area, surface area and volume of various figures.
Chemistry (pgs. 25-41)	MN	MA.9-11.9.3.1.4	Calculate measurements of plane and solid geometric figures; know that physical measurements depend on the choice of a unit and that they are approximations. Understand and apply the fact that the effect of a scale factor k on length, area and volume is to multiply each by k, k^2 and k^3, respectively.

Physics and Math (pgs. 43-63)	MN	MA.9-11.9.2.2.3	Recognize linear, quadratic, exponential and other common functions in real-world and mathematical situations; represent these functions with tables, verbal descriptions, symbols and graphs; solve problems involving these functions, and explain results in the original context. Sketch graphs of linear, quadratic and exponential functions, and translate between graphs, tables and symbolic representations. Know how to use graphing technology to graph these functions.
Physics and Math (pgs. 43-63)	MN	MA.9-11.9.2.3.5	Generate equivalent algebraic expressions involving polynomials and radicals; use algebraic properties to evaluate expressions. Check whether a given complex number is a solution of a quadratic equation by substituting it for the variable and evaluating the expression, using arithmetic with complex numbers.
Physics and Math (pgs. 43-63)	MN	MA.9-11.9.2.3.7	Generate equivalent algebraic expressions involving polynomials and radicals; use algebraic properties to evaluate expressions. Justify steps in generating equivalent expressions by identifying the properties used. Use substitution to check the equality of expressions for some particular values of the variables; recognize that checking with substitution does not guarantee equality of expressions for all values of the variables.
Physics and Math (pgs. 43-63)	MN	MA.9-11.9.2.4.2	Represent real-world and mathematical situations using equations and inequalities involving linear, quadratic, exponential and nth root functions. Solve equations and inequalities symbolically and graphically. Interpret solutions in the original context. Represent relationships in various contexts using equations involving exponential functions; solve these equations graphically or numerically. Know how to use calculators, graphing utilities or other technology to solve these equations.